

Salsola tragus
Chenopodiaceae
Russian thistle, tumbleweed

Salsola tragus is an annual herb with glabrous to short stiff hairs. Stems are generally branched and glabrous. Leaves are 8-52 mm in length and are threadlike, becoming rigid. The bracts of inflorescences are subcylindric and spiny. This species is found naturally in more or less saline, littoral habitats along the Mediterranean Sea (Rilke and Reimann 1996). In California, this introduced weed is common in disturbed places below 2700 m. The California Exotic Pest council (1995) included *S. tragus* as a "List 2" species, indicating that it is a wildland weed of secondary importance because it consists of localized populations in early stages of invasion that lack the ability to dominate native communities. *S. tragus* is generally considered to be a subspecies of the widespread European halophyte *Salsola kali*, though the taxonomic relationships between recognized subspecies is complicated by the extreme polymorphism within this group. The characters used in major studies of the taxonomy of this group have included habitat, shape, thickness of leaves and bracts, color, indument, tepal lobes, and wings (Allen 1968). The morphological variation observed within this section of the genus *Salsola* is possible associated with salinity levels. Teimann and Brecher (1995) and Rilke and Reimann (1996) reported increasing succulence as a consequence of salt treatments in *S. tragus*. Recent controlled growth studies of all three subspecies of *S. kali* indicate that while they are ecologically differentiated in Europe, morphological variation in growth form, prickliness, and succulence are obscured by considerable habitat induced and phenological variation. Until recently, *S. kali tragus* has been differentiated from *S.k. iberica* by its succulent leaves, glabrous stems and fruits without wings. The results of experiments by Rilke and Reimann (1996) however, invalidate this differentiation, except for the leaf character, and in general, these authors question the status of subspecies within *S. kali*. Onal (1969) showed in laboratory experiments that accessions of *S. kali tragus* grew better in moderately saline (0.5% NaCl) water, while Eschel (1985) found that in sand grown plants 1.50 mmol/l NaCl doubled the fresh weight of ssp. *tragus*. These authors conclude that *S. kali tragus* is the most salt tolerant subspecies of *S. kali* (Reimann and Breckle 1995).

In the United States, *S. tragus* is an important nonmycotrophic colonizing species in semiarid lands and may influence the abundance of later seral species (Allen and Knight 1984, Allen 1992). During primary succession on a windy ridge top in Wyoming, grass density was highest where *S. kali* was most abundant, indicating that *S. kali* plays a facultative role in succession at this site. Facilitation may be due to reduced wind speeds or snow accumulation acting on the grass seedlings. This facilitation effect might become competitive in late summer, and future work is needed to sort out the relative effects of these two processes (Allen and Allen 1988). Previous hypotheses of succession indicated that an increased inoculum density would hasten the rate of succession by making later seral species more competitive with early, seral, nonmycotrophic species (Reeves et al. 1979, Allen and Allen 1984). However, where facilitation, rather than competition, drives succession, myccorhizal fungi may have a different role. Myccorhizal inoculations led to

lower densities of *S. kali*, but no impact on mycorrhizal grasses. This had an apparent detrimental effect on succession at this site (Allen and Allen 1988). *S. tragus* may also facilitate colonization by adding oxalate leachate to the soil. Cannon et al. (1995) found that leachate derived from *S. tragus* solubilized P from that inorganic-bound soil P pool, making this P available to colonizing plants.

A recent study by Barrows (1997) indicates that *S. tragus* is a positive component of the habitat of the threatened Coachella Valley fringe-toed lizard (*Uta inornata*). Because it is a non-native species, managers have expressed concern over the effects of *S. tragus* on this lizard species. The data presented by Barrows, however, show that *S. tragus* is similar in appearance and microhabitat distribution as native species used by *U. inornata* for shading, though *S. tragus* does not provide a food source for the lizards, as native species do.

References

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